

## Orthopedics

### Anterior shoulder dislocation:

Joint affected .....glenohumeral joint

Cp..... Inability to raise arm above head

Nerve affected.....axillary.....deltoid muscle affection and **loss of sensation over shoulder**

TTT.....closed reduction followed by sling

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### Posterior shoulder dislocation:

Occurs in epileptics, electrical shock or eclampsia

Cp: .....adduction and internal rotation

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### Fracture surgical neck of the humerus:

Nerve affected .....axillary nerve

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### FRACTURE SHAFT HUMERUS :

Risk.....radial nerve injury.....wrist drop

TTT..... ARM CAST

When to suspect child abuse..... spiral fracture

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### DISLOCATED ELBOW:

Vascular impairment.....brachial artery

TTT.....reduction under anesthesia

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### Supracondylar fracture:

Risk..... **Brachial artery injury**

In acute stage..... **acute ischemia (5 Ps)**.....immediate removal of the cast

Nerve injury..... **median nerve and radial nerve**

Supracondylar fracture swelling elbow and numbness fingers....1<sup>st</sup> step.....**reduction**



If you suspect tight cast.....remove the cast

If vessel suspected.....immediate exploration

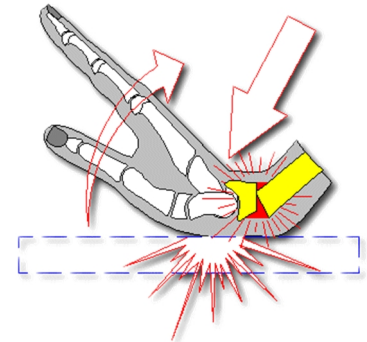
**Colle's fracture:**

**Age**.....old age post menopausal female

**Risk factor**.....osteoporosis.....do dexa scan

**Cause**.....fall on outstretched hand

**Shape**.....*Posterolateral displacement , impaction and angulation*



**Management:**

If stable: Closed reduction followed by a cast

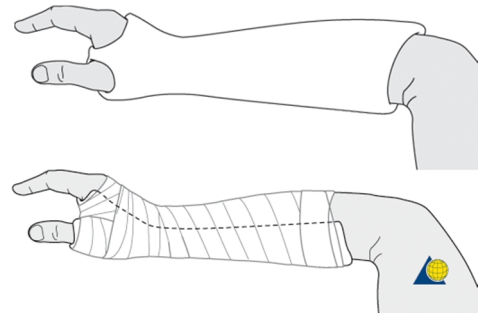
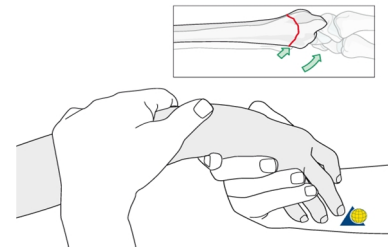
How reduction is done: **Disimpaction then traction the hand in the flexed position with ulnar deviation**

**Cast**..... Below elbow with pronated semi flexed hand with ulnar deviation

If unstable..... Surgery

**Second look**..... After 2 weeks by X-ray

- **Complication**.....malunion ,, dinner fork deformity



**Distal Radius Fracture (Smith's fracture)** Often described as reverse of colle's #.....**garden spade deformity**

**Mechanism:** Fall on to the back of the hand with wrist flexed.

**Scaphoid fracture:**

Most common fractured carpal bone

**Cause**.....fall on the outstretched hand

**Cp**.....tenderness in the anatomical snuff box

Radiological changes appear only after **2 weeks** ...

Risk.....**avascular necrosis**.....proximal necrosis.....non union



\_\_\_TTT..... stable....**thumb spica cast ( SPLINT)**

**Clavicular fracture:**

**Cause..... Fall on outstretched hand**

Common site..... **Middle third**

TTT : arm sling

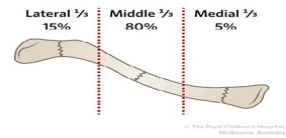
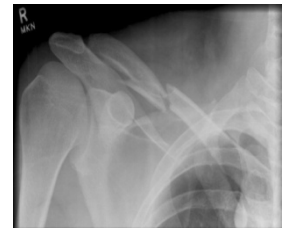
**Complication:**

**Malunion.....most common complication**

**Subclavian artery can be damaged ,..... ischemic Stroke**

**Neurological sign- Brachial plexus damage**

If vessels injury suspected or marked displacement..... **Surgery**



**Acromio – clavicular dislocation (ACJ joint)**

Pain and deformity at lateral end of clavicle.

**Management: Broad arm sling for 3 weeks.**

**Sterno- clavicular dislocation( SCJ joint)**

Localized tenderness and asymmetry of the inner ends of the clavicle.... **A broad arm sling for 2- 3 weeks**

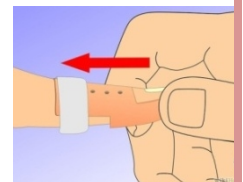
**Acute vascular problems/ airway obstruction ... intervention.**

**Mallet finger":**

Cause..... **trauma...avulsion of extensor tendon of distal phalynx**

TTT..... **Hyperextension of DIP joint for 6 weeks**

How..... **non adhesive tape**



**Fracture radius and ulna:**

Risk.....**compartment syndrome**

TTT of compartment syndrome.....**fasciotomy**



## Management:

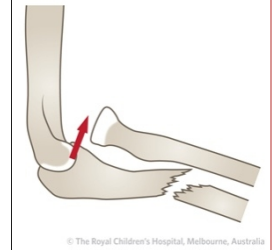
Adult.....plaster cast involving the wrist and elbow



## Monteggia fracture-dislocation:

Fracture of the proximal ulnar with dislocation of the radial head.  
Elbow flexion and forearm rotation are limited and painful

Motor branch of **radial nerve** commonly damaged, sensory branch not commonly damaged but should also be checked



## Management: ORIF

## Galeazzi fracture-dislocation (reverse Monteggia fracture.)

fractures of the distal one third of the radius with accompanying subluxation or dislocation of the distal radioulnar joint (DRUJ). Sometimes called

## Management:

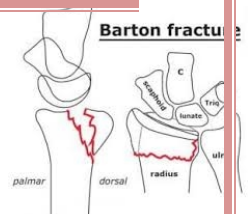
**Admit and place in a above elbow back slab plaster, elbow at 90 degrees and elevate the limb on pillows**



## ORIF

Nightstick Fracture Isolated **mid shaft ulnar** fracture

Barton's Fracture Volar distal radial fracture which extends into radio carpal joint.



## Distal Radial fracture in children/ Greenstick Fracture

Very common fracture of childhood.

Greenstick fracture is an **incomplete fracture.**

Pain & dinner fork deformity

Check for median nerve compression

Look for signs of carpal tunnel syndrome

## Management:

**Non displaced/ non angulated fractures, put in plaster cast for 3-4 weeks (backslab for 1<sup>st</sup> 2-3 days)**

**If symptomatic or angulation do (manipulation under anaesthesia.)**



**Peri-lunate dislocation** Lunate is m/c dislocated carpal bone

acute **median nerve compression** caused by the bone protruding into carpal tunnel.

**Management: 1) MUA 2) K-wire reduction**

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**Bennett's fracture**: Fracture of the base of the thumb or 1st metacarpal bone due to thumb hyperextension

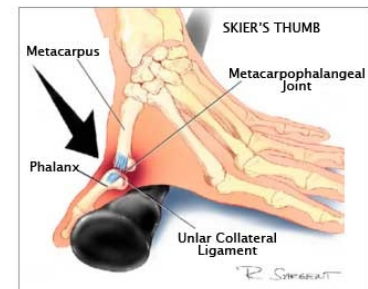


**Gamekeeper's thumb**

Tear of the **ulnar collateral ligament** of the thumb at MCP joint due to forced abduction of the thumb

**Management: Surgery**

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MECHANISM OF INJURY RESULTING IN A SKIER'S THUMB

**Tennis elbow (lateral epicondylitis)**

Inflammation at the point of the attachment of the **Extensor muscles** at the outer part of the elbow.

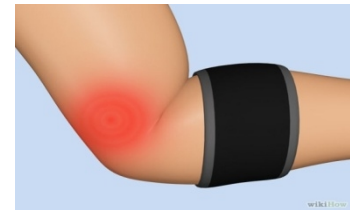
**Clinical picture:**

Job.....**tennis players, carpenters or violinists.**

Complaint.....**pain at the outer bony projection of the elbow**

Treatment: NSAIDs and brace under the elbow

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**Femoral fracture:**

**Shape**..... short leg with external rotation

**Risk**..... Fat embolism

TTT..... Intramedullary nail fixation

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**Neck of Femur Fracture**

Circumferential artery and sciatica nerve are commonly damaged.

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**Femur Shaft Fracture**

Femoral artery and femoral nerve are commonly damaged.

**In adults - Thomas splint followed by ORIF and Intramedullary Nail**

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## **Tibial fracture:**

Cause..... Direct trauma

Risk **compartmental** syndrome

TTT....casting

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## **Fracture fibula:**

Nerve affected.....common peroneal

TTT.....no ttt..... Just NSAIDs

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## **Patella Injury:**

occurs after direct blow e.g – fall on to the knee

**pre-patellar bursa** can be affected

**Management:**

**cylinder cast    if Displaced—> ORIF**

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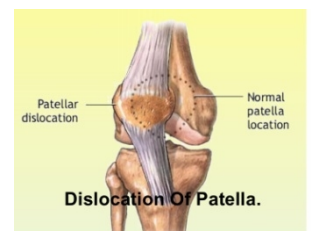
## **Dislocation of patella :**

The patella typically displaces laterally

**Reduce by pushing the patella medially while the leg is straight (extended knee) with Entonox analgesia**

**Cylinder plaster cast for 3 weeks followed by physiotherapy.**

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## **Knee injury:**

**1-Knee menisci :**

**Locking**=meniscus (cannot straighten knee fully)

Give away=meniscus (unable to support you)

**2-Cruciate ligament:**

**Anterior** is much more common than posterior:

**1-"pop" sound** during a twisting movement.....key word

2-Followed by inability to continue participation



**MRI**.....investigation of choice

MCL and PCL ..... usually managed conservatively.

Most meniscal injuries, ACL injuries require surgical management.

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### Types of Ligament Injury:

**Anterior Cruciate Ligament:** Anterior draw test, Lachman and pivot shift tests

**Posterior Cruciate ligament:** Posterior drawer test positive

**Lateral collateral ligament:** Varus stress test positive

**Medial collateral ligament:** Valgus stress test positive

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### Dislocation of the knee :

**Anterior dislocation:** Due to severe hyperextension

**Management:** Knee should be reduced asap

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### Ankle Dislocation

This is an **Orthopaedic Emergency**

Foot is cold and pale

Impalpable pulses

**Management:** Reduction before X-ray

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### Rupture achillis tendon:

Sudden severe pain after running or jumping

If gap.....complete rupture

If no rupture.....partial rupture

Simmond's Test Positive – patients lies prone on table with feet hanging off edge. Positive if no movement of foot on squeezing corresponding calf.

No gap.....conservative ttt

Gap.....emergent surgery less than 3 hs

Drug causing rupture tendon achillis.....quinolones

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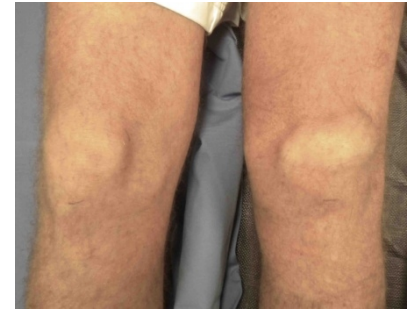
## Quadriceps Tendon Rupture

Rupture of quadriceps tendon

Also common in patients on steroids or those who abuse steroid especially sportsmen.

Loss of extension of knee

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## Management of Sprains and Soft Tissue Injuries

**Hand sprains** - immobilize in high arm sling for 2-3 days to reduce the swelling.

For **ankle sprain** - give crutches due to pain and advise to elevate the leg.

For **whiplash injury** - physiotherapy. Nowadays they do not use neck collar

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## Disc Prolapse:

Back pain radiating posterior aspect of the thigh down to the knee. All the way up to below knee

After heavy lifting

If Sensory loss is on L5 dermatome then disc prolapse is at L4/ S1

If sensory loss is on L4 dermatome then disc prolapse is at L3/L4

If sensory loss is on the S1 dermatome then disc prolapse is at L5/ S1

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## Stress fracture:

### Sites:

**Second metatarsal bone**.....most common

Proximal tibia.....very common

Risk factors.....**runners and jumpers**

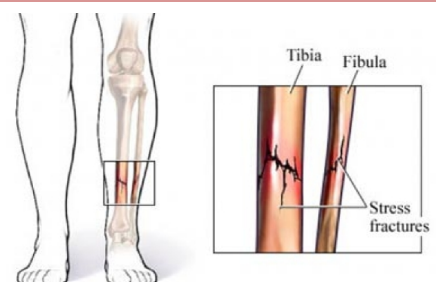
**Cp.** pain increases with activity and decreases with rest

Localized tenderness

X-ray.....**usually normal**

TTT..... rest and analgesic are the main TTT

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## Osgood-schlatter disorder

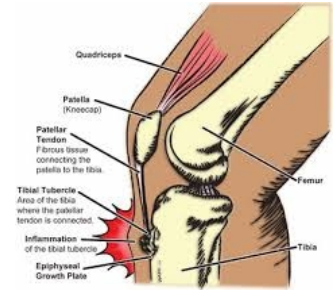
**Age** .....adolescence

**Risk factor**.....sports esp. running and jumbling

**Cp**..... Pain at the knee joint or at the patella

**Prognosis**.....self limited, usually resolve within 12-18 months

**Treatment**.....rest and Restriction of the activities



## Carpal tunnel syndrome

Painful disorder of the hand caused by pressure on the **median nerve**

**Sex** .....more at females

**PF**.....pregnancy, RA, hypothyroidism

**Symptoms**.....pain and numbness at the thumb , index and middle finger

**Timing** .....more at the **night**

**Complication**: weakness and numbness of the hand

**Inv**.....**Nerve conduction velocity and EMG**

**Tests**.....phalen test

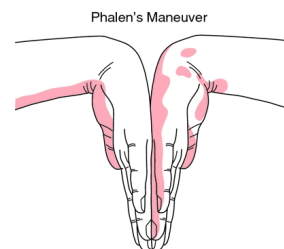
**Treatment**.....

First line....**analgesic and splint** or **Cortisone injection**

**Surgery**:incision of transverse carpal ligament ... ..release of flexor retinaculum



ADAM.



## **Spinal cord compression:**

**Causes:**

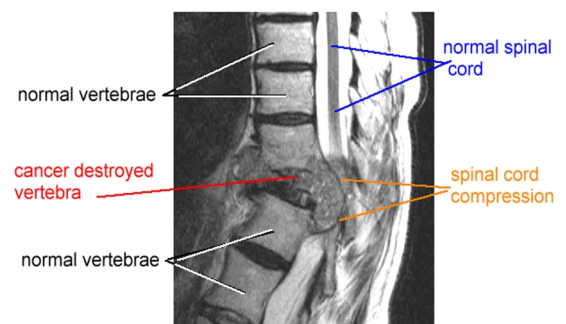
**Metastasis of cancer e.g: breast**

**C/P:**

**BACK Pain**

**UMNL** below level of compression

**MRI**.....***investigation of choice.***



**Treatment:**

**Dexamethazone** ..... vvvvvv imp ( first step)

LONG TERM TTT.....**irradiation**

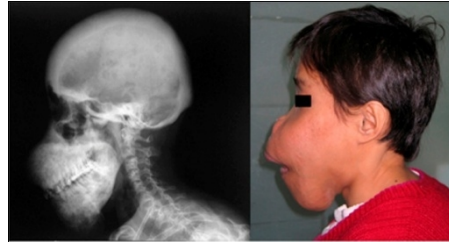
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**Paget disease:** Remodeling disorder

**Cp**.....usually asymptomatic

Bony pain increased at night

Skull deformities.....**deafness**



**Inv:**

Alkaline phosphatase.....**increased**

Serum calcium.....**normal**

X-ray.....**lytic lesions**



TTT.....**biphosphonate**

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**Osteosarcoma:**

**Age:**

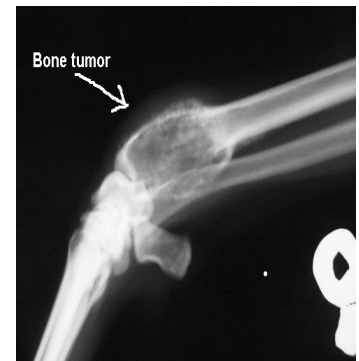
**Up to 15 years old**

**Site:long bones**

Thigh near Knee

***C/P: painful movement***

X- ray **Subcortical new bone formation**



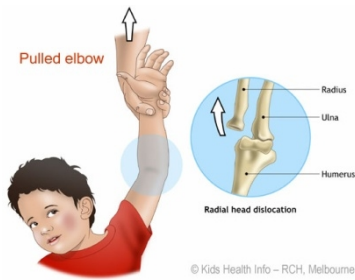
N:B:Teenager after trauma discovered swelling at metaphysis of femur and x-ray shows periosteal elevation and new bone formation.....**osteosarcoma**

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**Nurse maid elbow (radial head dislocation)**

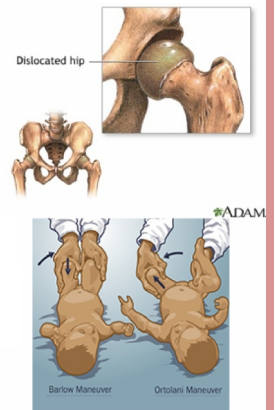
**Cause**..... Strong pulling of the child arm

**TTT..... Manual reduction by supination and flexion**



**Developmental dysplasia of the hip joint: ( congenital hip dislocation):**

- Legs of different lengths
- Uneven skin folds on the thigh
- mother notices it during change of the diaper
- Limping
- 



**Barlow test or Ortolani test :**The above tests are (+) and the physician can feel or listen a click

Inv :..... **ultrasonography** is the best

**TTT: Pavlik harness maneuver**



**Legg calve perthes disease**

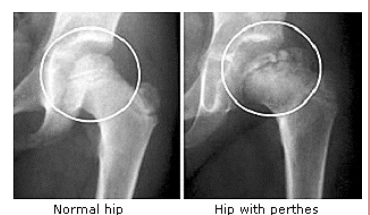
Age.....**4-8**

Limp.....**painless**

Limited movement.....**abduction and internal rotation**

**X-ray( frog and lateral view)**..... increased joint space, collapse and deformity

**TTT.....mainly conservative**

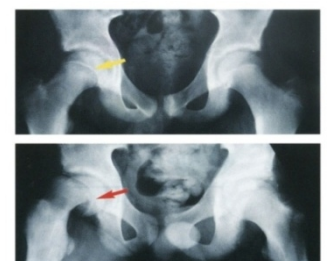


**Slipped capital femoral epiphysis**

**Obese adolescent boy (10-15 ys)**

Painful limp

Limited movement.....**abduction and internal rotation**



X-ray (frog lateral view).....**displaced** femoral head medial and posterior and

**Widening of epiphysis**

TTT:....mainly **surgery**

Complication.....**avascular necrosis**

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Fracture that may damage radial nerve ....supracondylar fracture ( angulated

Most common loss of radial pulse after fracture .....supracondylar fracture

one liable to fracture after fall.....**calcanous**

if laceration at the face.....do face x-ray

First inv in a child with limping.....**X-Ray**

Myofascial pain : change of position improves the pain

Osteoid osteoma : benign bone tumour : ttt is aspirin

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Anterior dislocation of shoulder.....**axillary**

Fracture neck humerus.....**axillary**

Fracture shaft humerus, fracture head of humerus, Fracture at snuff box  
.....**radial**

Fracture medial epicondyle.....**ulnar**

supracondylar fracture.....**brachial artery median and radial nerve**

Saturday nerve palsy.....**radial**

Dislocated elbow.....**brachial artery and median N**

Posterior dislocation of hip.....**sciatica**

Fracture shaft femur.....femoral A and femoral N

Fracture fibula.....**common peroneal**

Posterior dislocation of knee.....**popliteal artery**

Nerve affected after surgery in posterior triangle of neck : accessory N

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# Anatomy

## BLOOD SUPPLY OF THE UPPER LIMB

### On the right side:

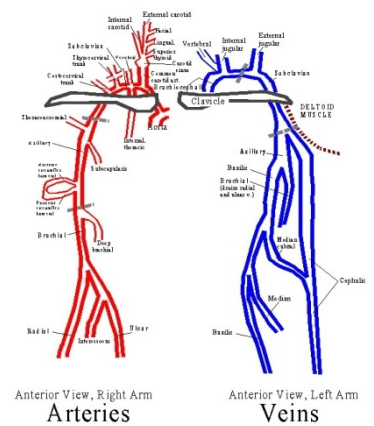
Aorta-----brachiocephalic truncus-----  
subclavian artery ---> Axillary artery ---> Brachial artery--->  
radial and ulnar artery---> which form the palmer arch-----

> digital arteries

NB: The brachiocephalis truncus gives branch to common carotid artery and the subclavin artery gives branch to vertebral artery

On the left side direct from the aorta branches off common carotid artery and subclavian artery.

Selected Arteries and Veins of the Upper Body



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## VENOUS SYSTEM

- A. Deep veins
- B. Superficial veins

### DEEP VENOUS BLOOD FLOW

Palmer metacarpal --->deep palmer veins----->Radial and ulnar veins-----> Brachial vein----->Axillary vein--->subclavian----->brachiocephalic

### SUPERFICIAL VEINS

- 1. BASILIC VEIN
- 2. CEPHALIC VEIN

Both of which drain into brachial vein -----> subclavian vein  
-----brachiocephalic ----->Superior vena cava

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## **FACIAL NERVE:**

Innervates the muscles of expression and anterior 2/3 of taste and oral cavity.

## **Branches:**

Greater petrosal nerve : innervates the nasal glands, palates, lacrimal glands.  
Supplies the stapedius, chorda tympani ( submandibular gland, sublingual gland and taste of the tongue.

Posterior auricular nerve: muscles around the ear

Temporal branch of facial nerve:

Zygomatic branch of facial nerve

Marginal branch of mental nerve of facial nerve

Cervical branch of facial nerve

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## **TRIGEMINAL NERVE**

**1-OPHTHALMIC BRANCH** comes out through superior orbital fissure.

*Frontal nerve: Innervates the scalp, forehead, upper eye lid, conjunctiva and cornea, Nose (including the tip of the nose), Frontal sinuses*

**2-MAXILLARY BRANCH**-comes out from the skull through foramen rotundum

*- Infraorbital nerve -Innervates the cheek, upper lip, upper teeth and gums.*

-nasal mucosa, palate and roof of the pharynx

-the maxillary, ethmoid and sphenoid sinuses and part of the meningitis

## **3-MANDIBULAR BRANCH**

Comes out from foramen foramen ovale

Innervates the lower lip, lower teeth and gums.

-chin and jaw (but not the angle of jaw which is supplied by the C2-C3)

### **Branches:**

**Lingual nerve** supplies the sensation of the anterior 2/3 of the tongue

*Inferior alveolar nerve supplies:*

**Auriculotemporal** nerve= is commonly gets injured during the tempomandibular surgery leading to loss of sensation on the auricle and skin surrounding ear

**Buccal nerve**=supplies the mucus membranes of the buccal i. e inside

**Mental nerve**: supplies the chin and lower lip (mucus membrane) it is the branch of inferior alveolar which itself is branch of mandibular branch of trigeminal.

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**Specific nerve damage:**

1-T4 is level of nipples

2-T10 is umbilicus

3-C4 over acromioclavicular joint

4-Diaphragmatic nerve usually irritated in peritonitis causing shoulder tip pain. Also known as phrenic nerve.

5-Claw hand if **ulnar nerve damage**. the little finger and ring finger are affected

6-Wrist drop is a sign of **radial nerve** damage.

**7-Carpal tunnel syndrome** is a sign of median nerve damage and compression is at the level of the wrist. Phalen's test or tinnel test can be used to make the diagnosis of carpal tunnel syndrome.

8-Foot drop can be caused by both peroneal nerve and sciatica nerve.

9-Sciatica is a term usually used to describe the lower back pain radiating all the way down the leg up to knee or below it.

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**Radial nerve innervate:**

All extensors of hand i.e. extension of wrist, fingers, elbows

Therefore radial nerve palsy causes **wrist drop**

**Ulnar n nerve:**

Innervates all intrinsic hand muscles, except the LOAF which are innervated by the median nerves.

Therefore ulnar n palsy if **claw hand**

**Median nerve** LOAFL-

**The 2** Lateral lubricals

**O-** Opponens pollicis

**A-** Abductor pollicis brevis

**F-** Flexor pollicis brevis

**Shoulder abduction:**

- . Deltoid
- . Axillary
- . C5

**Elbow flexion:**

- . Biceps
- . Musculocutaneous
- . C5, C6

**Elbow extension:**

- . Triceps
- . Radial
- . C7

**Finger Extension:**

- . Extensor Digitorum superficialis & profundus
- . Radial
- . C7

**Finger flexion:**

- . Flexor digitorum profundus & superficialis
- . Median & Ulnar
- . C8

**Finger abduction :**

- . First dorsal interosseous
- . Ulnar
- . T1

**Thumb abductor:**

- . *Abductor Pollicis Brevis*
- . Median
- . T1

**Finger Adduction:**

- . Second Palmar interossei
- . Ulnar
- . T1

**Serratus Anterior muscles:**

- . Imagine you are pushing the a car. In this position you are using the serratus anerior muscle

**supraspintus:**

- . Suprascapular nerve.
- . Lifting arms sideways between 60 and 120 degrees



**Infraspinatus muscle:**

With a flexed elbow, move the arm inwards

Long flexors of little and finger ring:

Flexion of distal IPJ is flexor digitorum Profundus

flexor pollicis longus: Flexes thumb

**Hip flexion Hip Extension**

*L1, L2; Iliopsoas S1; Gluteus Muscle  
Sacral plexus ; Inferior gluteal nerve*

**Knee extension**

L3, L4; Femoral nerve Quadriceps muscle

**Dorsiflexion foot**

L5;

Tibialis anterior muscle Deep Peroneal

**Knee Flexion:**

Hamstring muscle

Sciatic nerve (foot drop)

L5, S1

**Plantar flexion of the foot:**

*Gastrocnemius muscle, Posterior tibialis  
S1*

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**Reflexes**

Supinator Radial nerve , C6

Triceps Radial nerve, C7,

Biceps – C5 Musculocutaneous nerve

Finger Median, Ulnar nerves

Knee Femoral, L3, L4

Ankle S1

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## DERMATOME FOR LOWER LIMB:

L1 Pocket

Inner thigh L3

Knee L4

Medial malleoli L5

Lateral Dorsum of the foot S1

S5 Saddle

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## Upper limb

C4 Shoulder

C5 arm

*C6 Thumb*

*C7 Middle finger*

C8 Little finger

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## LYMPH NODES DRAINAGE

The cervix lymph drains into the para-aortic lymph nodes

Vulva lymph drains into superficial Inguinal lymph nodes ----->then into deep inguinal lymph nodes

Lower nodes then into deep inguinal lymph nodes

Body of the uterus drains into external ilia lymph nodes

Fundus of the uterus drains into para-aortic lymph nodes

Ovaries drain into para-aortic lymph nodes

Superior half of the rectum drains into pararectal lymph nodes --->then into inferior mesenteric lymph nodes

Lower half of the rectum drains into internal iliac and sacral group of LN.

Testes drain into paraaortic lymph nodes

Superficial Inguinal Lymph nodes drains fro penis, scrotum, perineum, buttock, vulva and abdominal wall below the umbilicus.

Usually the **superficial lymph nodes** drain into **deep inguinal** then into **external iliac** and then into **para-aortic**

*Ovaries drain into para-aortic lymph nodes*

Prostate drains into external iliac

**EXTERNAL ILIAC LYMPH NODES:** drains from the glans of the penis, prostate, upper vagina, fundus of the bladder.

**INTERNAL ILIAC NODES:** drains from deeper perineum, urethra, buttock and back of the thigh.

**PARAAORTIC LYMPH NODES** drains from ovaries, testes and superior rectum

**SUPERFICIAL CERVICAL LYMPH NODES:** nodes: lower part of auricular and parotid region.

**ANTERIOR CERVICAL LYMPH NODES:** lower part of the larynx, thyroid gland and upper part of the trachea.

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### LYMPH NODES OF THE FACE

**SUBMENTAL LYMPH NODES:** drains from the floor of the mouth, apex of the tongue and lower lip then goes to deep cervical lymph nodes..

### **LYMPHATIC VESSELS FO THE TONGUE:**

-Apical of the tongue or tip =submental

-Lateral margin of the tongue= submaxillary lymph nodes

-basal of the tongue =superior deep cervical LN

**SUBMAXILARY OR SUBMANDIBULAR LYMPH NODES**= nasal cavity and gums, cheek, upper lip, lateral part of the lip, medial palpabrae commissure, lateral part of the lower lip.

**SUBMENTAL LYMPH NODES:** lower lip and floor of the mouth and apex of the tongue.

***BREAST:*** *mainly drain into axillary lymph node*

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